# IMPACT OF TYPE 2 DIABETES MELLITUS ON HEALTH-RELATED QUALITY OF LIFE AMONG PATIENTS FROM A TERTIARY CARE HOSPITAL IN SOUTHERN INDIA

A Synopsis of the thesis to be submitted for the award of the degree of

**DOCTOR OF PHILOSOPHY IN**

**MULTI-DISCIPLINARY HEALTH SCIENCES AND TECHNOLOGY**

**(BIOSTATISTICS)**

**Submitted to**

**SRI BALAJI VIDYAPEETH**

(Deemed to be University of UGC Act 1956)

*Submitted by*

**Ms. Janani S**

[UIN: 1905002016]

*Under the Guidance of*

**Dr. Ezhumalai G**

Professor of Biostatistics

Sri Balaji Vidyapeeth (Deemed to be University)

SBV Campus, Pillaiyarkuppam, Puducherry -607402

Co-Guide: **Dr. Mahadevan S**

Professor Emeritus, Department of Pediatrics

Sri Venkateshwaraa Medical College Hospital & Research Centre

Ariyur, Puducherry-605102

## TABLE OF CONTENT


| S. No | TITLE | Pg. No |
|---|---|---|
| 1 | Abstract | 01 |
| 2 | Chapter I- Introduction, Aim & Objectives, Research Question | 02 |
| 3 | Chapter II- Review of Literature | 05 |
| 4 | Chapter III- Materials & Methods | 08 |
| 5 | Chapter IV- Data analysis & Interpretation | 29 |
| 6 | Chapter V- Discussion | 33 |
| 7 | Chapter VI- Summary & Conclusion | 34 |
| 8 | Reference | 35 |


## LIST OF TABLES


| Table No. | List of Table | Pg. No |
|---|---|---|
| 1 | Mean (SD) value of HRQoL among the participants by different domains | 10 |
| 2 | Percent distribution of diabetics in overall HRQoL by selected socio-demographic variables | 10 |
| 3 | Comparison of mean HRQoL score with selected background variables | 14 |
| 4 | Logistic regression of overall HRQoL with selected background variables (Shows significance in Univariate analysis) | 16 |
| 5 | False discovery rate (FDR) using Benjamini- Hochberg (BH) critical value for multiple hypotheses testing | 25 |
| 6 | Multiple regression analysis described the contribution of each variable in predicting overall HRQoL | 27 |
| 7 | Distribution of Knowledge on Diabetes Mellitus among Diabetics | 28 |

## LIST OF ANNEXURES

| S. No | List of Annexures |
|---|---|
| 1 | Research Methodology Exam Pass Certificate |
| 2 | Research Methodology Course Completion Certificate |
| 3 | Research and Publication Ethics Course Completion Certificate |
| 4 | IHEC approval certificate |
| 5 | Poster & Oral Presentation Certificate |
| 6 | Published article |

**ABSTRACT:**

**Background:** Diabetes Mellitus (DM) has become a major global health concern due to its increasing prevalence and its impact on quality of life (QoL), particularly in patients with Type 2 Diabetes Mellitus (T2DM). Health-Related Quality of Life (HRQoL) is an essential outcome in chronic disease management.

**Objectives:** To assess the HRQoL among diabetics and its association with selected background characteristics.

**Methodology:** A cross-sectional study was conducted among 355 T2DM patients aged between 41 to 60 years attending the outpatient department of a tertiary care hospital. A pretested semi-structured questionnaire, SF-36 and DKQ-24 tool were used to collect data. Descriptive statistics, t-test, ANOVA, and logistic regression were used for analysis.

**Results:** The mean age of participants was 56.7 ± 10.2 years and male were 53%. The mean scores for overall HRQoL was 48.81±7.22. Six domains among eight in HRQoL were higher than the overall mean score while two were lesser than the average. Factors significantly associated with HRQoL among diabetics includes age, education, occupation, socio-economic factors, doing exercise, maintaining good Glycaemic control and family history of diabetes.

**Conclusion:** The mean score of HRQoL among diabetics was much less and the findings highlight the importance of patient cantered approach in diabetes management, addressing not only clinical factors but also socio-economic and lifestyle aspects to improve overall HRQoL. These findings highlight the importance of addressing multiple factors in diabetes management to improve patients' overall quality of life.

**Keywords:** Health Related Quality of Life, Type 2 Diabetes mellitus and Tertiary care Hospital

# CHAPTER-I

# INTRODUCTION

## 1.1 Background of the study

Diabetes Mellitus (DM) is a chronic and progressive metabolic disorder. Globally Type 2 DM accounts for about 90–95 % of all diagnosed cases of diabetes with higher prevalence among older adults. [3] The number of cases of diabetes worldwide is estimated to be around 422 million. [1] The global prevalence is 8.8 % and the number is expected to rise to 10.4 % by 2040. India has the highest prevalence of T2DM in the world with a National DM prevalence of 8.6 % and it stands second to China in relation to the burden of DM. [2] It is estimated that there will be nearly 80 million Indians with T2DM in India by 2030. T2DM constitutes a high burden for both patients and health care system in India mainly due to its complications, which account for much of the premature morbidity and mortality. [4]

HRQoL in diabetics is a measure of overall wellbeing related to socio-demographic variables, physical and clinical parameters. Good maintenance of diabetes will improve the HRQoL but other factors would have their own influence. Many research have been conducted on diabetics and the factors responsible for poor HRQoL, but a detailed analysis for identifying the contribution of each parameter is null. Hence, this study aims to estimate the level of HRQoL among diabetics and estimate the influence of each variable on the outcome variable.

## 1.2 Aims:

To assess the HRQoL among diabetics and its association with selected background characteristics

## 1.3 Objectives:

- To assess the Health-Related Quality of Life (HRQoL) among Type 2 Diabetes Mellitus patients attending tertiary care hospital.
- To enumerate the factors associated with HRQoL
- To find the association between HRQoL with socio-demographic and clinical variables of Type 2 Diabetic Mellitus patients.
- To assess the knowledge on Diabetes Mellitus among Type 2 Diabetic Mellitus patients.

### 1.4 Research Question:

What is the impact of Type 2 Diabetes Mellitus on the health-related quality of life (HRQoL) among patients in a tertiary care hospital in Southern India?

## CHAPTER-II

## REVIEW OF LITERATURE

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance and progressive β-cell dysfunction, leading to hyperglycemia. The global prevalence of diabetes has surged over the past few decades due to rising obesity rates, sedentary lifestyles, and population aging. According to the International Diabetes Federation (IDF), over 537 million adults worldwide were living with diabetes in 2021, with projections estimating a further rise in prevalence [(5)]. India, often referred to as the diabetes capital of the world, has seen a dramatic increase in T2DM cases, necessitating urgent interventions to mitigate its impact on health-related quality of life (HRQoL) [(6)]. HRQoL is a multidimensional construct encompassing physical, mental, and social well-being. It is particularly crucial in chronic diseases such as diabetes, where disease burden, treatment regimens, and complications significantly influence overall well-being. The present review explores various determinants of HRQoL among T2DM patients, the impact of complications and comorbidities, and evidence-based interventions to improve patient outcomes.

### 2.1 Health-Related Quality of Life in T2DM

HRQoL in T2DM patients is influenced by a range of demographic, clinical, and psychosocial factors. Several studies have reported that T2DM negatively affects physical health due to persistent symptoms such as fatigue, polyuria, and neuropathic pain [(7)]. Moreover, the disease imposes psychological burdens, with an increased prevalence of depression, anxiety, and diabetes distress, further deteriorating HRQoL [(8)]. A study conducted by Chawla et al. [(9)] in India found that poor glycemic control (HbA1c > 7%) was significantly associated with lower HRQoL scores, particularly in the domains of physical functioning and general health perceptions. Similarly, another study in South India reported that diabetic patients with higher education levels and socioeconomic status exhibited better HRQoL, likely due to improved disease awareness and access to healthcare services [(10)].

### 2.2 Impact of various Diabetes Complications on HRQoL

T2DM is associated with microvascular and macrovascular complications, which significantly impair HRQoL. Diabetic neuropathy, nephropathy, and retinopathy are the most commonly reported complications, leading to progressive disability and reduced functional capacity [(11)].

#### 2.2.1 Neuropathy and HRQoL

Diabetic peripheral neuropathy (DPN) is a major contributor to chronic pain, mobility limitations, and increased risk of falls. Studies have shown that patients with DPN experience a 30-40% lower HRQoL compared to those without complications, particularly in physical and emotional well-being domains [(12)].

#### 2.2.2 Nephropathy and HRQoL

Diabetic nephropathy, characterized by progressive kidney dysfunction and increased proteinuria, leads to significant morbidity. Patients requiring dialysis or renal transplantation report severely diminished HRQoL due to physical exhaustion, dietary restrictions, and financial burden [(13)].

#### 2.2.3 Retinopathy and HRQoL

Diabetic retinopathy, the leading cause of vision impairment among working-age adults, affects self-care ability, mobility, and mental health. A study by Zhang et al. [(14)] found that patients with severe retinopathy had 45% lower HRQoL scores than those without ocular complications.

### 2.3 Role of Comorbidities in HRQoL

T2DM is often accompanied by hypertension, dyslipidaemia, cardiovascular diseases (CVD), and obesity, all of which further reduce HRQoL.

#### 2.3.1 Hypertension and HRQoL

Hypertension is a common comorbidity among diabetic patients, with nearly 70% of T2DM patients developing elevated blood pressure levels. Studies indicate that patients with uncontrolled hypertension report lower HRQoL, particularly due to increased risks of stroke, heart failure, and kidney disease [(15)].

#### 2.3.2 Cardiovascular Diseases and HRQoL

T2DM is a well-established risk factor for coronary artery disease (CAD) and stroke, both of which significantly impair HRQoL. A meta-analysis of 15 studies revealed that diabetic patients with CVD had significantly lower HRQoL scores, with limitations in daily activities and social engagement [(16)].

### 2.3.3 Obesity and HRQoL

Obesity, a major risk factor for T2DM, exacerbates HRQoL impairments through increased joint pain, reduced mobility, and higher incidences of obstructive sleep apnea [17]. Weight reduction through lifestyle modifications and bariatric surgery has been shown to improve HRQoL in obese diabetic individuals [18].

## 2.4 Psychosocial Determinants of HRQoL in T2DM

Beyond physical health, psychosocial factors such as mental health status, social support, and self-care behaviour play crucial roles in shaping HRQoL.

### 2.4.1 Depression and Anxiety in T2DM

Depression and anxiety are twice as prevalent in diabetic patients compared to the general population [19]. Diabetes-related distress, characterized by emotional burdens and worries about disease management, contributes significantly to poor HRQoL. Cognitive-behavioral therapy (CBT) and peer-support programs have been suggested as effective interventions for improving mental well-being in diabetic patients [20].

### 2.4.2 Social Support and HRQoL

Strong social support systems have been linked to better diabetes self-care, medication adherence, and improved glycemic outcomes. Patients with high levels of family and community support report significantly higher HRQoL scores than those lacking social networks [21].

## 2.5 Self-Management and HRQoL

Self-management behaviours, including dietary adherence, physical activity, medication compliance, and blood glucose monitoring, play a pivotal role in determining HRQoL. Interventions such as structured diabetes education programs have been shown to enhance self-efficacy and HRQoL [22].

## 2.6 Interventional Strategies to Improve HRQoL in T2DM

### 2.6.1 Lifestyle Modifications

Dietary modifications, regular physical activity, and weight management are foundational for improving HRQoL. A randomized controlled trial (RCT) by Look AHEAD Research Group demonstrated that intensive lifestyle interventions led to significant improvements in HRQoL and glycemic control [23].

### 2.6.2 Pharmacological Interventions

Several antidiabetic agents, including SGLT2 inhibitors and GLP-1 receptor agonists, have demonstrated beneficial effects on HRQoL beyond glycemic control. SGLT2 inhibitors have

been associated with weight loss and reduced cardiovascular risks, contributing to improved well-being [24].

### 2.6.3 Psychosocial and Behavioural Interventions

Cognitive-behavioural therapy (CBT), peer support programs, and mindfulness-based stress reduction have been effective in addressing diabetes-related distress and depression, thereby improving HRQoL [25].

### 2.6.4 Integrated Care Models

Multidisciplinary approaches involving endocrinologists, dietitians, psychologists, and diabetes educators have shown promising results in improving patient-reported HRQoL outcomes [26].

# CHAPTER-III

# Materials & Methods

**3.1 Study Type:** Prospective study

**3.2 Study Design:** Cross sectional study

**3.3 Study Area:** Sri Venkateshwaraa Medical College Hospital and Research Centre, Ariyur, Puducherry

**3.4 Study Period:** 01.05.2022 to 30.04.2023 (1 year)

**3.5 Study Population:** Patients attending Medicine outpatient department, SVMCH &RC, diagnosed with type 2 Diabetes Mellitus

**3.6 Eligibility Criteria:**

### 3.6.1. Inclusion Criteria:

- Patients aged from 40-60 years with a history of more than five year of T2DM
- Patients willing to participate in the study

### 3.6.2. Exclusion Criteria:

- Pregnant women with Gestational Diabetes Mellitus .
- Diabetic patients on dialysis

**3.7 Sample Size:**

The calculated sample size was **355**

The sample size was calculated by assuming

**Alpha (α) = 0.05,**

**Power- 80%**

**Absolute Precision- 3%**

**Non- Response rate – 10%**

**Pooled standard deviation of 19.25* [(1)]**

**Formula:**

$$n = \frac{(S)^2 (Z_{1-\beta} + Z_{1-\alpha/2})^2}{(d)^2}$$

(Pooled standard deviation was calculated by considering standard deviation of Highest score (social functioning domain (86.04±22.28)) and lowest score (Vitality domain (47.46±15.63)) [1]

**3.8 Sampling Technique:** Convenient Sampling

**3.9 Data collection procedure:**

The study was conducted after obtaining approval from Institutional Scientific Research Committee and Ethical Committee approval. The following structured questionnaire were used to collect data from participants.

1. Diabetes Co-morbidity Evaluation Tool in Primary Care (DCET-PC)

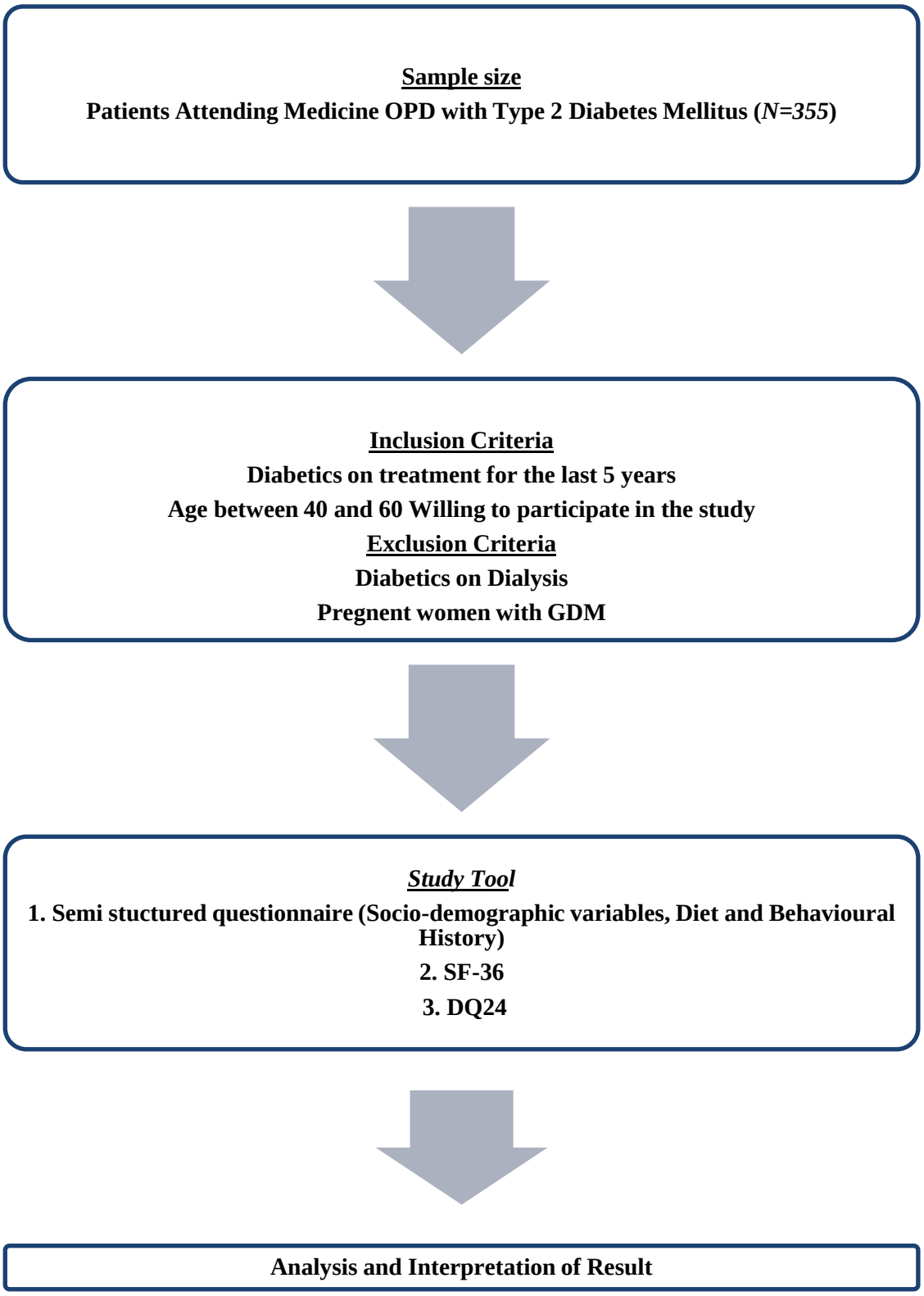
1.1 Sociodemographic variables - Age Sex, Socio-economic status, Employment status and

1.2 Clinical variables- Existence of comorbidity condition, 15 chronic condition, Duration of diabetes and Type of diabetes treatment

2. WHO- Short Form Health Survey 36 (SF-36)

3. Validated questionnaire – Knowledge on Type 2 Diabetes Mellitus (DQ-24)

## 1.3 Research Flow Chart:


Sample size
Patients Attending Medicine OPD with Type 2 Diabetes Mellitus (N=355)
Inclusion Criteria
Diabetics on treatment for the last 5 years
Age between 40 and 60 Willing to participate in the study
Exclusion Criteria
Diabetics on Dialysis
Pregnent women with GDM
Study Tool
1. Semi stuctured questionnaire (Socio-demographic variables, Diet and Behavioural History)
2. SF-36
3. DQ24
Analysis and Interpretation of Result

## 1.4 Statistical Analysis:

Data was entered in Microsoft Excel and Analysis was done by SPSS software ,version 23.0. All qualitative variables were described as frequency and percentage, quantitative variables were expressed in mean and Standard deviation. The participants were grouped as poor, fair and good according to the score arrived using SF-36 for HRQoL. Chi-square test was used to check the association between HRQoL and background characteristics. The mean HRQoL score was compared across background characteristics using independent t-test / ANOVA according to the number of category in each variable. Logistic regression was used to assess the strength of each risk factors contributed for HRQoL. To control the False Discovery Rate (FDR) in multiple hypothesis testing, the Benjamini-Hochberg (BH) procedure was applied. A p-value $\leq 0.05$ will be considered as statistically significance.

# CHAPTER-IV

# DATA ANALYSIS AND INTERPRETATION

## 4.1 Background characteristics

The participants were diabetics and 355 of them were included in this research as per inclusion and exclusion criteria during 2023-24. The participants were in 41 to 60 years of age and a higher proportion was observed in 46 to 60 years. Male were 53% and literates were 87%. Professionals by occupation were 21% and unemployed were 9%. Almost all participants were got married except two. According to BG Prasad scale for economic status, middle class were 63% and upper class were 12%. Duration of diabetes was 6 to 20 years and a majority were in 11 to 15 years. Family history of diabetes was present for almost 85% of the participants.

### 4.1.1 Glycaemic control, complications and co-morbidity

A little higher proportion of diabetics maintain good level of HbA1c. Among the diabetic complications, neuropathy was leading with 74%. Hypertension was observed as predominant co-morbidity (76%).

## 4.2. Health related quality of life (HRQoL)

HRQoL was measured using the standard WHO HRQoL questionnaire (SF-36). Analysis was done based on the guidelines given in the module and the mean score for overall HRQoL and

8 domains were obtained.

**Table 1: Mean (SD) score of HRQoL among the participants by different domains (n=355)**

| HRQoL domains | Mean ± SD |
|---|---|
| **Overall Score (All domains)** | **48.81±7.22** |
| Physical functioning | 50.45±13.25 |
| Role of limitations due to physical health | 50.70±25.47 |
| Role of limitations due to emotional problems | 49.08±29.06 |
| Energy/ Fatigue | 44.66±18.30 |
| Emotional well- being | 45.18±16.02 |
| Social functioning | 49.80±24.14 |
| Pain | 49.94±24.33 |
| General health | 50.85±15.54 |

The overall HRQoL score was observed to be 48.81±7.22 among T2DM patients. The maximum mean score was observed in General Health with 50.85±15.54 and the minimum score was in Energy/Fatigue with 44.66±18.30. Role of limitations due to physical health, Role of limitations due to emotional problems, social functioning, pain and general health were higher than the overall score with 50.70±25.47, 49.08±29.06, 49.80±24.14, 49.94±24.33 and 50.85±15.54 respectively. Energy/Fatigue and Emotional wellbeing were below the overall score with 44.66±18.30 and 45.18±16.02 respectively.

### 4.2.1 Association of HRQoL with selected background variables

**Table 2: Percent distribution of diabetics in overall HRQoL by selected socio-demographic variables (N=355)**

| Variables | n | HRQoL in percentage | | | $X^2$ | p- value |
|---|---|---|---|---|---|---|
| | | Poor (≤43) n=79 | Fair (44-52) n=159 | Good (>52) n=117 | | |
| HRQoL in Percentage | 355 | 22.2 | 44.7 | 32.9 | | |

| Variables | n | HRQoL in percentage | | | $X^2$ | p- value |
|---|---|---|---|---|---|---|
| | | Poor (≤43) n=79 | Fair (44-52) n=159 | Good (>52) n=117 | | |
| **Age (in years)** | | | | | | |
| 41- 45 | 92 | 12.0 | 45.6 | 42.4 | | |
| 46 -50 | 101 | 17.8 | 46.5 | 35.7 | | |
| 51-55 | 86 | 34.9 | 44.2 | 20.9 | 18.740 | 0.005* |
| 56-60 | 76 | 26.3 | 42.1 | 31.6 | | |
| **Gender** | | | | | | |
| Male | 191 | 24.6 | 43.5 | 31.9 | 1.324 | 0.516 |
| Female | 164 | 19.5 | 46.3 | 34.1 | | |
| **Education** | | | | | | |
| Illiterate | 47 | 36.2 | 51.1 | 12.8 | | |
| Primary/ Middle | 60 | 31.7 | 53.3 | 15.0 | | |
| High school | 47 | 34.0 | 57.4 | 8.5 | | |
| Higher secondary | 75 | 17.3 | 42.7 | 40.0 | 64.754 | 0.001* |
| Degree/ Diploma | 77 | 11.7 | 40.3 | 48.0 | | |
| Post Graduate degree and above | 49 | 10.2 | 26.5 | 63.3 | | |
| **Occupation** | | | | | | |
| Professional | 74 | 12.2 | 28.4 | 59.5 | | |
| Skilled worker | 90 | 18.9 | 43.3 | 37.8 | | |
| Semiskilled worker | 43 | 20.9 | 46.5 | 32.6 | | |
| Clerical/ shop/ farm | 67 | 31.3 | 43.3 | 25.4 | | |
| Unskilled worker | 48 | 29.2 | 58.3 | 12.5 | 48.732 | 0.001* |
| Unemployed | 33 | 27.3 | 66.7 | 6.1 | | |
| **Socio- economic status** | | | | | | |
| Upper class | 3 | 9.5 | 41.3 | 49.2 | | |
| Upper Middle class | 77 | 17.7 | 42.5 | 39.8 | | |
| Middle class | 100 | 27.5 | 48.2 | 24.3 | 26.815 | 0.001* |
| Lower middle class | 80 | 18.1 | 39.8 | 42.1 | | |
| Lower class | 55 | 35.8 | 50.7 | 13.5 | | |

| Variables | n | HRQoL in percentage | | | $X^2$ | p- value |
|---|---|---|---|---|---|---|
| | | Poor (≤43) n=79 | Fair (44-52) n=159 | Good (>52) n=117 | | |
| **Body Mass Index** | | | | | | |
| Underweight | 36 | 16.7 | 50.0 | 33.3 | | |
| Normal | 191 | 20.4 | 43.5 | 36.1 | | |
| Over weight | 95 | 26.3 | 44.2 | 29.5 | 3.967 | 0.681 |
| Obese | 33 | 27.3 | 48.5 | 24.2 | | |
| **Exercise** | | | | | | |
| Yes | 174 | 16.7 | 34.5 | 48.9 | 39.034 | 0.001* |
| No | 181 | 27.6 | 54.7 | 17.7 | | |
| **Diet** | | | | | | |
| Vegetarian | 36 | 25.0 | 41.7 | 33.3 | 0.225 | 0.894 |
| Mixed | 319 | 21.9 | 45.1 | 32.9 | | |
| **Use of Tobacco** | | | | | | |
| Yes | 39 | 17.9 | 53.8 | 28.2 | 1.468 | 0.480 |
| No | 316 | 22.8 | 43.7 | 33.5 | | |
| **Use of Alcohol** | | | | | | |
| Yes | 30 | 20.0 | 53.3 | 26.7 | 1.002 | 0.606 |
| No | 325 | 22.5 | 44.0 | 33.5 | | |
| **Family History of diabetes** | | | | | | |
| Yes | 302 | 22.2 | 43.0 | 34.8 | 3.387 | 0.184 |
| No | 53 | 22.6 | 54.7 | 22.6 | | |
| **Duration of DM (in years)** | | | | | | |
| 6-10 | 106 | 16.0 | 42.5 | 41.5 | | |
| 11-15 | 193 | 24.4 | 45.6 | 30.1 | 6.424 | 0.170 |
| 16-20 | 56 | 26.8 | 46.4 | 26.8 | | |
| **Glycaemic Control** | | | | | | |
| Good (≤7%) | 189 | 19.0 | 37.6 | 43.4 | 19.912 | 0.001* |
| Poor (>7%) | 166 | 25.9 | 53.0 | 21.1 | | |

| Variables | n | HRQoL in percentage | | | $X^2$ | p- value |
|---|---|---|---|---|---|---|
| | | Poor (≤43) n=79 | Fair (44-52) n=159 | Good (>52) n=117 | | |
| **Co-morbidity** | | | | | | |
| Yes | 293 | 23.2 | 44 | 31 | 9.088 | 0.010* |
| No | 62 | 8.5 | 49.5 | 42 | | |
| **Diabetic complication** | | | | | | |
| Present | 240 | 29.7 | 41.2 | 29.1 | 25.796 | 0.001* |
| Absent | 115 | 5.5 | 53.4 | 41.1 | | |

*p<0.05, statistically significant

The results shows that diabetics in lower age group were high (42%) in good HRQoL compared to older age group. Gender-wise difference in HRQoL was not observed in this research. There were 63.3% of diabetics in Good HRQoL compared to illiterates ensuring educational qualification plays a role in modifying the level of HRQoL. Occupationally better positioned diabetics were significantly high (59%) in good HRQoL compared to other employee categories. Almost half of the diabetics were in good HRQoL when they belongs to upper socio-economic status. Conversely, poor socio-economic diabetics were very less in good HRQoL with 13.5%. Doing exercise improves the HRQoL among 48.9% of diabetics while it was only 17.7% among diabetics not doing exercise. Those who were in good Glycaemic control were significantly high with 43.4% in good HRQoL while it was only 21% among poor maintaining of Glycaemic level. Without co-morbidity, diabetics were high (42%) in good HRQoL and they were less when they are with co-morbidity. Diabetics without diabetic complications in Good HRQoL were significantly high with 41% and it was 29% among diabetics with diabetic complication.

### 4.2.2 Comparison of mean HRQoL with selected background variables

**Table 3: Comparison of mean HRQoL score with selected background variables**

| Variables | n | HRQoL score | | F-value | p- value |
|---|---|---|---|---|---|
| | | Mean | SD | | |
| **All** | 355 | **48.81** | **7.22** | - | - |
| **Age (in years)** | | | | | |
| 41-45 | 92 | 50.47 | 6.06 | | |
| 46-50 | 101 | 50.13 | 7.20 | 6.92 | 0.001* |
| 51-55 | 86 | 47.87 | 7.65 | | |
| 56-60 | 76 | 46.31 | 7.28 | | |
| **Gender** | | | | | |
| Male | 191 | 48.39 | 7.20 | 1.18** | 0.23 |
| Female | 164 | 49.30 | 7.24 | | |
| **Education** | | | | | |
| Illiterate | 47 | 45.44 | 5.83 | | |
| Primary/Middle | 60 | 45.48 | 5.62 | | |
| High school | 47 | 46.22 | 6 | | |
| Higher Secondary | 75 | 49.65 | 7.24 | 13.97 | 0.001* |
| Degree/ Diploma | 77 | 51.33 | 6.69 | | |
| Post Graduate degree &above | 49 | 53.37 | 7.87 | | |
| **Occupation** | | | | | |
| Professional | 74 | 52.44 | 6.79 | | |
| Skilled | 90 | 49.23 | 7.63 | | |
| Semi-skilled | 43 | 48.58 | 7.63 | 6.91 | 0.001* |
| Clerical/ shop/ Farm | 67 | 47.61 | 7.14 | | |
| Unskilled | 48 | 46.05 | 5.76 | | |
| Unemployed | 33 | 46.29 | 5.20 | | |
| **Socio- Economic status** | | | | | |
| Upper | 43 | 53.94 | 4.09 | | |
| Upper Middle | 77 | 51.82 | 7.58 | | |
| Middle | 100 | 47.44 | 7.20 | 21.73 | 0.001* |
| Lowe Middle | 80 | 46.15 | 6.21 | | |
| Lower | 55 | 44.57 | 5.50 | | |

| Variables | n | HRQoL score | | F-value | p- value |
|---|---|---|---|---|---|
| | | Mean | SD | | |
| **Body Mass Index** | | | | | |
| Underweight | 36 | 49.77 | 7.67 | 0.92 | 0.43 |
| Normal | 191 | 49.18 | 7.26 | | |
| Over weight | 95 | 48.02 | 6.99 | | |
| Obese | 33 | 47.91 | 7.16 | | |
| **Marital Status** | | | | | |
| Married | 344 | 48.84 | 7.13 | 1.24 | 0.29 |
| Unmarried | 02 | 56.55 | 5.58 | | |
| Widow | 04 | 45.62 | 11.32 | | |
| Widower | 05 | 46.20 | 9.91 | | |
| **Religion** | | | | | |
| Hindu | 256 | 48.44 | 7.33 | 1.19 | 0.30 |
| Muslim | 57 | 49.77 | 7.30 | | |
| Christian | 42 | 49.75 | 6.31 | | |
| **Exercise** | | | | | |
| Yes | 174 | 51.06 | 7.32 | 6.02** | 0.001* |
| No | 181 | 46.65 | 6.44 | | |
| **Diet** | | | | | |
| Vegetarian | 36 | 48.77 | 7.06 | 0.26** | 0.79 |
| Mixed | 319 | 49.11 | 8.59 | | |
| **Use of Tobacco** | | | | | |
| Yes | 39 | 48..62 | 7.07 | 0.69** | 0.86 |
| No | 316 | 48.89 | 7.25 | | |
| **Use of Alcohol** | | | | | |
| Yes | 30 | 48.27 | 7.37 | 0.425** | 0.67 |
| No | 325 | 48.86 | 7.22 | | |
| **Family History of diabetes** | | | | | |
| Yes | 302 | 48.89 | 7.16 | 0.52 | 0.60 |
| No | 53 | 48.33 | 7.62 | | |
| **Duration of DM (in years)** | | | | | |
| 6-10 | 106 | 54.82 | 23.45 | 3.40 | 0.03* |
| 11-15 | 193 | 48.04 | 24.22 | | |
| 16-20 | 56 | 46.41 | 24.16 | | |
| **Glycaemic Control** | | | | | |
| Good (≤7%) | 189 | 50.15 | 7.42 | 3.80** | 0.001* |
| Poor (>7%) | 166 | 47.28 | 6.68 | | |

| Variables | n | HRQoL score | | F-value | p- value |
|---|---|---|---|---|---|
| | | Mean | SD | | |
| **Co-morbidity** | | | | | |
| Yes | 293 | 48.77 | 7.17 | 5.14** | 0.60 |
| No | 62 | 49.24 | 7.50 | | |
| **Diabetic complication** | | | | | |
| Present | 240 | 47.83 | 7.25 | 3.73** | 0.001* |
| Absent | 115 | 50.84 | 6.74 | | |

*p<0.05, statistically significant

According to the guidelines given in the SF-36 questionnaire manual, the overall total score was obtained for HRQoL. The mean score obtained was compared across selected background variables and presented in table 2. The results reveal that the mean HRQoL was significantly improves with higher education, ranging from 45.4(5.8) for Illiterates to 53.3(7.8) for postgraduates. Significantly higher mean score of HRQoL was observed among professionals with 52.4(6.79) and decreases with decreased level of occupations. Upper class diabetics had significantly higher level of HRQoL compared to lower income groups. Diabetic individuals who exercised had a significantly higher HRQoL score (51.06±7.32) compared to those who did not exercise (46.6±6.4). The average HRQoL score was highest for those with diabetes for 6 to 10 years but declined as the duration of the condition increased. Individuals who maintained a good glycemic level (≤7) had a significantly higher HRQoL score (50.1±7.4) compared to those with poor glycemic control. Diabetes complication had significantly reduced HRQoL score 47.8(7.2) compared to without complication (50.8±6.7)

### 4.2.3 Logistic regression for overall HRQoL with selected background variables

**Table 4: Logistic regression of overall HRQoL with selected background variables (Shows significance in Univariate analysis)**

| Variables (Predictors) | B | Standard Error | Odds Ratio | z | Wald Test | | | 95% Confidence interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Wald Statistic | df | p | Lower bound | Upper bound |
| **AGE - Reference (41-45 years)** | | | | | | | | | |
| 46-50 | -4.43 | 1.11 | 0.01 | -3.96 | 15.75 | 1 | 0.001 | -6.63 | -2.24 |
| 51-55 | -4.81 | 1.20 | 0.00 | -3.99 | 15.97 | 1 | 0.001 | -7.17 | -2.45 |
| 56-60 | -3.60 | 1.01 | 0.02 | -3.55 | 12.63 | 1 | 0.001 | -5.59 | -1.61 |
| **EDUCATION-Reference (Illiterate)** | | | | | | | | | |
| Primary/Middle | -1.80 | 1.31 | 0.16 | -1.37 | 1.87 | 1 | 0.171 | -4.39 | 0.77 |
| High school | -0.66 | 1.29 | 0.51 | -0.51 | 0.26 | 1 | 0.606 | -3.20 | 1.87 |
| Higher | 1.18 | 1.13 | 3.26 | 1.04 | 1.08 | 1 | 0.298 | -1.04 | 3.41 |

| Variables (Predictors) | B | Standard Error | Odds Ratio | z | Wald Test | | | 95% Confidence interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Wald Statistic | df | p | Lower bound | Upper bound |
| Secondary Degree/ Diploma | 3.04 | 1.12 | 21.03 | 2.70 | 7.33 | 1 | 0.007 | 0.84 | 5.25 |
| PG Degree and above | 4.18 | 1.46 | 65.56 | 2.85 | 8.15 | 1 | 0.004 | 1.31 | 7.05 |
| **OCCUPATION -Reference (Unemployed)** | | | | | | | | | |
| Professional | -0.76 | 0.81 | 0.46 | -0.93 | 0.87 | 1 | 0.35 | -2.36 | 0.83 |
| Skilled | -2.05 | 1.01 | 0.12 | -2.03 | 4.12 | 1 | 0.042 | -4.03 | -0.07 |
| Semi-skilled | -2.23 | 0.98 | 0.10 | -2.25 | 5.08 | 1 | 0.024 | -4.16 | -0.29 |
| Clerical/ shop/ Farm | -2.88 | 1.39 | 0.05 | -2.06 | 4.26 | 1 | 0.039 | -5.61 | -0.14 |
| Unskilled | -7.62 | 2.08 | 0.04 | -3.65 | 13.35 | 1 | 0.001 | -11.71 | -3.53 |
| **SOCIO-ECONOMIC STATUS- Reference (Lower)** | | | | | | | | | |
| Lower Middle | 4.22 | 1.42 | 68.13 | 2.96 | 8.77 | 1 | 0.003 | 1.42 | 7.01 |
| Middle | 4.59 | 1.49 | 98.85 | 3.08 | 9.49 | 1 | 0.002 | 1.67 | 7.51 |
| Upper Middle | 7.08 | 1.60 | 1192.86 | 4.40 | 19.38 | 1 | 0.001 | 3.93 | 10.23 |
| Upper | 11.55 | 2.12 | 104282.3 | 5.43 | 29.48 | 1 | 0.001 | 7.38 | 15.72 |
| **BMI -Reference (Underweight)** | | | | | | | | | |
| Normal | -0.52 | 1.05 | 0.59 | -0.50 | 0.25 | 1 | 0.61 | -2.59 | 1.54 |
| Over weight | -1.58 | 1.12 | 0.20 | -1.41 | 1.99 | 1 | 0.15 | -3.78 | 0.61 |
| Obese | -2.85 | 1.45 | 0.05 | -1.96 | 3.84 | 1 | 0.05 | -5.70 | -0.01 |
| **EXERCISE -Reference (Yes)** | | | | | | | | | |
| Exercise (No) | -2.77 | 0.68 | 0.06 | -4.05 | 16.40 | 1 | 0.001 | -4.12 | -1.43 |
| **DIET- Reference (Vegetarian)** | | | | | | | | | |
| Diet (Mixed) | 2.24 | 0.89 | 9.47 | 2.50 | 6.28 | 1 | 0.012 | 0.49 | 4.00 |
| **DURATION OF DIABETES MELLITUS- Reference (6-10)** | | | | | | | | | |
| 11-15 | 1.03 | 0.96 | 2.82 | 1.07 | 1.15 | 1 | 0.283 | -0.85 | 2.93 |
| 16-20 | -1.27 | 0.66 | 0.28 | -1.92 | 3.68 | 1 | 0.055 | -2.57 | 0.02 |
| **GLYCEMIC CONTROL- (Reference ≤7)** | | | | | | | | | |
| Glycemic control (>7) | -2.94 | 0.75 | 0.05 | -3.88 | 15.12 | 1 | 0.001 | -4.43 | -1.46 |
| **DIABETIC COMPLICATION- Reference (Present)** | | | | | | | | | |
| Diabetic complication (Absent) | 2.93 | 0.85 | 18.81 | 3.45 | 11.92 | 1 | 0.001 | 1.26 | 4.60 |

In regression analysis, model fit and the predictive capacity of the variables included were found satisfactory. The logistic regression findings indicate that age increases the odds of worsening good HRQoL was high. One unit of increase in educational category the good HRQoL likely to increase 21 to 65 times more compared to Illiterates. As compared to unemployed, professionals and other occupational group were significantly deteriorated HRQoL. Middle and upper socio-economic diabetics were 68 and above times more likely to

have good HRQoL compared to diabetics in lower socio-economic status. Those who do not exercise were more likely to have 94% reduced level of good HRQoL compared to those who do exercise.

### 4.3 Physical functioning

#### 4.3.1 Association of physical functioning with selected background variables

The findings indicated that physical functioning was poor in 40.6% of diabetics, fair in 31.8%, and good in 27.6%. Poor physical functioning was highest among older diabetics (56-60 years: 47.4%) and least among younger individuals (46-50 years: 36.6%). Males and females had similar physical functioning scores, with no significant gender-based differences.

#### 4.3.2 Comparison of mean physical functioning score with selected background variables

Mean PF scores across age groups, with the highest scores observed in the 46-50 (52.02±13.60) and 51-55 (52.03±11.15) age groups and the lowest in the 56-60 group (47.23±13.12), the differences were not statistically significant (p=0.06).

#### 4.3.3 Logistic regression for physical functioning score with selected background variables

The model demonstrated a statistically significant improvement in fit with the inclusion of predictors ($\Delta X^2 = 49.63$, $p = 0.226$), and the Nagelkerke $R^2$ value of 0.17 indicated that 17.6% of the variance in physical functioning was explained by the model. Occupation significantly influenced physical functioning, with clerical/shop/farm workers being 67.4% less likely (OR = 0.32, p = 0.014) and unskilled workers 56.8% less likely (OR = 0.43, p = 0.04) to report better physical functioning compared to professionals.

### 4.4 Role Limited due to physical health

#### 4.4.1 Association of role limited due to physical health with socio-demographic variables

The study on the Role Limited Due to Physical Health (RLPH) domain of HRQoL among diabetics showed that 30.5% had poor RLPH, 35.2% had fair RLPH, and 34.1% had good RLPH. Socioeconomic status (p=0.001), exercise, and glycemic control were significantly associated with RLPH. Diabetics from higher socioeconomic classes had better RLPH (44.2% in upper class vs. 12.7% in lower class), those who exercised had significantly higher good RLPH (45.4% vs. 23.2% in non-exercisers), and diabetics with good glycemic control had better RLPH (39.2% vs. 28.3% in those with poor control).

### 4.4.2 Comparison of mean role limited due to physical health score with selected background variables

Diabetics from lower socioeconomic status had the highest RLPH score (62.27±21.4), while those from upper socioeconomic groups had the lowest scores, indicating a significant inverse relationship between socioeconomic status and RLPH (p=0.01). Engaging in regular exercise was associated with higher RLPH scores (56.46±26.29) compared to those who did not exercise (45.16±23.4), with this difference being statistically significant (p=0.01). Similarly, individuals with good glycemic control had significantly higher RLPH scores (53.83±24.76) compared to those with poor control (47.13±25.88) (p=0.01), suggesting that poor glycemic control increases role limitations due to physical health problems.

### 4.4.3 Logistic regression for role limited due to physical health score with selected background variables

The Nagelkerke $R^2$ value of 0.21 suggests a higher explanatory capacity, explaining up to 21.3% of the variance. Exercise showed a significant association. Diabetics who did not exercise were 45.3% less likely to avoid role limitations compared to those who exercised regularly (OR = 0.54, p = 0.029*). This significant result underscores the importance of regular physical activity in reducing role limitations due to physical health problems.

## 4.5 Role Limited due to emotional health

### 4.5.1 Association of role limited due to emotional health with socio-demographic variables

The study on Role Limited Due to Emotional Health (RLEH) among diabetics showed that 53.0% had poor RLEH, 34.4% had fair RLEH, and only 12.7% had good RLEH. Diabetics with higher education (postgraduates: 42.1% good RLEH) and professionals (47.5% good RLEH) reported better emotional well-being, suggesting that education and stable employment help manage emotional health challenges. Socioeconomic status played a key role, with good RLEH being highest in the upper class (39.5%) and lowest in the lower class (28.5%) ($p<0.05$).

### 4.5.2 Comparison of mean role limited due to emotional health score with selected background variables

The RLEP score showed a linear increase with education, from 41.04±24.45 among illiterate

diabetics to 59.24±27.57 among postgraduates (p=0.003), indicating that higher education correlates with better emotional well-being. Similarly, higher socioeconomic status was associated with higher RLEP scores, with the upper-class group scoring the highest (56.32±29.45) and the lower class scoring the lowest (42.65±30.41) (p=0.04). Physical activity also played a significant role, as diabetics who exercised had higher RLEP scores (52.85±28.39) compared to non-exercisers (45.46±29.31) (p=0.001).

### 4.5.3 Logistic regression for role limited due to emotional health score with selected background variables

The model demonstrated a good fit ($\Delta X^2 = 54.15$, $p = 0.118$) and explained 18.9% of the variance (Nagelkerke $R^2 = 0.18$). Education significantly impacted emotional health-related role functioning, with diabetics holding postgraduate degrees being 3.13 times more likely to avoid role limitations compared to illiterate diabetics (OR = 3.13, p = 0.018). Similarly, those with a degree/diploma were 2.22 times more likely to avoid role limitations (OR = 2.21, p = 0.056), though this was marginally significant.

## 4.6 Energy/ Fatigue

### 4.6.1 Association of energy/ fatigue with socio-demographic variables

The study on Energy/Fatigue levels among diabetics revealed that 38.3% had poor, 29.9% had fair, and 31.8% had good Energy/Fatigue levels. Professionals (37.8%) had higher good Energy/Fatigue levels than the unemployed (27.3%), and the upper-class diabetics (42.5%) reported better energy levels compared to the lower class (31.7%), with this trend being marginally significant (p=0.054).

### 4.6.2 Comparison of mean energy/ fatigue score with selected background variables

Energy/Fatigue score was high among diabetics belonging to lower socio-economic status with 51.09±18.30 and lowest among the upper socio-economic status with 41.27±18.22. This shows the mean score across the difference socio-economic categories were significant (p=0.05). Hence, Energy/Fatigue was high among lower socio-economic status group compared to upper socio-economic status diabetics.

### 4.6.3 Logistic regression for energy/ fatigue score with selected background variables

The model demonstrated a reasonable fit ($\Delta X^2 = 42.23$, $p = 0.505$) and explained 15.1% of the variance (Nagelkerke $R^2 = 0.15$). SES showed a significant impact, with diabetics in the upper SES group being 2.64 times more likely to report higher energy levels compared to the lower

SES group (OR = 2.64, p = 0.042).

### 4.7 Emotional health

#### 4.7.1 Association of emotional health with socio-demographic variables

The analysis of the Emotional Well-being domain of HRQoL among diabetics showed that 35.2% had poor, 25.9% had fair, and 38.9% had good emotional well-being. A significant association was observed between age and emotional well-being, with the 51-55 age group reporting the highest poor well-being (43.0%), whereas younger diabetics (41-45 years) had the highest good well-being (46.7%), indicating that emotional health tends to decline with age.

#### 4.7.2 Comparison of mean emotional health score with selected background variables

The findings revealed that Body Mass Index (BMI), regular exercise, and co-morbidities significantly influenced emotional well-being. Diabetics with normal or underweight BMI had better emotional well-being scores, while overweight and obese individuals reported lower scores (p=0.01). Regular physical activity was associated with higher emotional well-being scores, emphasizing its positive impact on mental health. Additionally, the presence of co-morbidities significantly reduced emotional well-being (p=0.001), highlighting the burden of multiple health conditions on psychological well-being.

#### 4.7.3 Logistic regression for emotional health score with selected background variables

The model demonstrated a reasonable fit ($\Delta X^2 = 45.46$, $p = 0.37$) and explained 16.3% of the variance (Nagelkerke $R^2 = 0.163$). BMI shows that obese diabetics were 73.5% less likely to report better emotional well-being compared to underweight diabetics ($p = 0.024$), indicating a significant negative impact of obesity on emotional health. Additionally, diabetics with co-morbidities were 65.2% less likely to report better emotional well-being compared to those without co-morbidities ($p = 0.013$), highlighting the substantial adverse effect of co-morbid conditions on emotional well-being.

### 4.8 Social Functioning

#### 4.8.1 Association of social functioning with socio-demographic variables

The analysis of the Social Functioning domain of HRQoL among diabetics revealed that 41.1% had poor, 34.6% had fair, and 23.9% had good social functioning. Educational status was significantly associated (p=0.041) with social functioning, where higher education levels (postgraduates: 32.7%) were linked to better social functioning, while illiterates had the lowest

good SF (19.1%). Occupation was also significantly associated (p=0.032), with professionals having the best SF (31.1%) and unemployed diabetics the poorest (57.6%).

A significant inverse association (p=0.005) was found with socioeconomic status, where higher-class diabetics had poorer SF (upper class: 53.5% poor SF), whereas lower-class diabetics had better SF (29.1%). Family history of diabetes was significantly associated (p=0.043) with poorer SF, with those having a family history reporting lower SF levels. Duration of diabetes also had a significant association (p=0.025), with longer duration leading to poorer SF.

### 4.8.2 Comparison of mean social functioning score with selected background variables

Younger diabetics had higher SF scores, with 41-50 years scoring 53.93±24.65, while older diabetics (51-55 years: 44.24±22.32, 56-60 years: 47.59±22.51) had lower scores, indicating a decline with age (p=0.02). Education played a crucial role, as SF scores increased from 47.08±23 among illiterates to 58.36±22.17 among postgraduates (p=0.03), suggesting that higher education enhances social engagement. Socioeconomic status also had a significant effect, with lower-class diabetics scoring 41.58±25.06 and upper-class diabetics scoring 57.01±21.34 (p=0.004), indicating better social functioning with improved financial stability. Diabetes duration impacted SF, with those having the condition for a shorter period (6-10 years: 54.82±23.45) scoring higher compared to long-duration diabetics (16-20 years: 46.41±24.16) (p=0.03), suggesting that prolonged disease may restrict social interactions. Additionally, better glycemic control was associated with higher SF scores (52.21±24.63 vs. 47.07±23.35, p=0.04), reinforcing the importance of controlled blood sugar levels in maintaining social well-being.

### 4.8.3 Logistic regression for social functioning score with selected background variables

This logistic regression analysis highlights key factors affecting social functioning among diabetics. The model exhibited a strong fit ($\Delta X^2 = 72.56$, $p = 0.003$*), accounting for 24.9% of the variance (Nagelkerke $R^2 = 0.24$). Age significantly impacted social functioning, with diabetics aged 56–60 years being 55.6% less likely to report better social interactions than those aged 41–45 years (OR = 0.44, p = 0.033), indicating a decline with age. Occupational status also played a role, as skilled diabetics were 60.5% less likely to report better social functioning than illiterate diabetics (OR = 0.39, p = 0.032). Similarly, semi-skilled, clerical/shop/farm, and unskilled workers had significantly lower odds of better social functioning (ORs between 0.382 and 0.561, p = 0.022), demonstrating the negative impact of lower-skilled occupations.

Socioeconomic status (SES) emerged as a strong predictor, with diabetics in the upper SES group being 5.6 times more likely to report better social functioning than those in the lower SES group (OR = 5.63, p = 0.001). The upper-middle (OR = 3.2, p = 0.013) and middle (OR = 2.7, p = 0.031).

### 4.9 Pain

#### 4.9.1 Association of pain with socio-demographic variables

The Pain domain of HRQoL among diabetics was categorized into Poor (34.9%), Fair (32.1%), and Good (33.0%). Age was significantly associated with pain perception, with the 51-55 years group reporting the highest poor pain scores (52.3%), whereas younger diabetics (41-45 years: 28.3%) had the lowest poor pain scores and the highest good pain scores (40.2%), indicating better pain tolerance or management in younger individuals.

#### 4.9.2 Comparison of mean pain score with selected background variables

Diabetics (41-45 years) reported higher pain scores (53.77±23.67) compared to older individuals (55-60 years: 40.78±24.45), indicating that age significantly affects pain perception (p=0.001). Higher education was associated with increased pain scores, ranging from 41.86±2.02 (high school) to 54.46±24.80 (higher secondary education) (p=0.05), suggesting that better-educated individuals might be more aware of or sensitive to pain. Socioeconomic status also played a significant role, with upper-class diabetics reporting higher pain scores (55.40±23.05) than lower-class diabetics (44.59±25.19) (p=0.01), possibly due to differences in health awareness or healthcare access. Additionally, those who exercised regularly reported higher pain scores (52.67±24.79) than non-exercisers (47.32±23.66) (p=0.03), which may indicate increased muscle strain or heightened sensitivity to physical discomfort among active individuals.

#### 4.9.3 Logistic regression for pain score with selected background variables

The model's strong fit ($\Delta X^2 = 69.41$, p = 0.007) and its ability to explain 23.7% of the variability (Nagelkerke $R^2 = 0.23$) indicate that these factors meaningfully contribute to pain experiences.

Age-related findings suggest that diabetics aged 56–60 years are 60.4% less likely to report higher pain scores than those aged 41–45 years (OR = 0.39, p = 0.014), possibly due to physiological adaptations, altered pain perception, or differences in pain tolerance.

Underweight diabetics were 2.9 times more likely to report higher pain scores compared to those with normal BMI (OR = 2.89, p = 0.017), emphasizing the vulnerability of lower-weight

individuals to pain, potentially due to lower muscle mass or nutritional deficiencies. Similarly, overweight diabetics had 2.4 times the odds of experiencing higher pain (OR = 2.36, p = 0.038), indicating that excess weight might contribute to joint stress and inflammation.

### 4.10 General Health

#### 4.10.1 Association of general health with socio-demographic variables

The analysis of the General Health (GH) domain in HRQoL among diabetics showed that 43.1% had poor GH, 24.8% had fair GH, and 32.1% had good GH. Among socio-demographic factors, education level was significantly associated with GH, with higher education linked to better perceived health.

#### 4.10.2 Comparison of mean general health score with selected background variables

The General Health Score, a key component of HRQoL, was significantly influenced by education level and socioeconomic status. Higher education was associated with better general health scores, ranging from 46.91±13.45 (high school) to 56.75±13.92 (degree/diploma) (p=0.01), indicating that better-educated individuals perceive their general health more positively. Similarly, socioeconomic status played a crucial role, with upper-class individuals reporting higher scores (54.45±10.52) compared to lower-class individuals (46.23±16.06) (p=0.01), suggesting that economic stability may contribute to better health awareness, access to healthcare, and overall well-being.

#### 4.10.3 Logistic regression for general health score with selected background variables

The model fit ($\Delta X^2 = 38.57$, p = 0.663) and the Nagelkerke $R^2$ of 0.13 suggest that the model explains 13.8% of the variability in general health outcomes. Education appears to play a role in general health, though statistical significance varies across levels. Diabetics with a postgraduate degree or higher were 3.45 times more likely to report better general health compared to illiterate diabetics (OR = 3.45, p = 0.003), demonstrating a significant positive impact of advanced education.

### 4.11 False discovery rate (FDR) using Benjamini- Hochberg (BH) critical value for multiple hypotheses testing

**Table 5: False discovery rate (FDR) using Benjamini- Hochberg (BH) critical value for multiple hypotheses testing**

| Domains of HRQoL | Selected background variable | p-value | BH critical Value | Confirmation based on BH critical value |
|---|---|---|---|---|
| Overall HRQoL | Age | 0.001 | 0.001 | Decision confirmed |
| | Education | 0.001 | 0.001 | Decision confirmed |
| | Occupation | 0.001 | 0.001 | Decision confirmed |
| | Socio- Economic Status | 0.001 | 0.001 | Decision confirmed |
| | Exercise | 0.001 | 0.001 | Decision confirmed |
| | Glycemic Control | 0.001 | 0.001 | Decision confirmed |
| | Diabetic Complication | 0.001 | 0.001 | Decision confirmed |
| | Duration of Diabetes Mellitus | 0.030 | 0.036 | Decision confirmed |
| Physical Component Summary | Age | 0.020 | 0.034 | Decision confirmed |
| | Occupation | 0.050 | 0.044 | **Not confirmed** |
| | Education | 0.001 | 0.001 | Decision confirmed |
| | Socio-Economic Status | 0.001 | 0.001 | Decision confirmed |
| | Exercise | 0.001 | 0.001 | Decision confirmed |
| | Glycemic Control | 0.001 | 0.001 | Decision confirmed |
| | Diabetic Complication | 0.001 | 0.001 | Decision confirmed |
| Mental Component Summary | Age | 0.001 | 0.001 | Decision confirmed |
| | Education | 0.001 | 0.001 | Decision confirmed |
| | Occupation | 0.001 | 0.001 | Decision confirmed |
| | Socio- Economic Status | 0.001 | 0.001 | Decision confirmed |
| | Exercise | 0.002 | 0.026 | Decision confirmed |
| | Duration of Diabetes Mellitus | 0.040 | 0.041 | Decision confirmed |
| Role Limited due to Physical Functioning | Socio- Economic Status | 0.001 | 0.001 | Decision confirmed |
| | Exercise | 0.001 | 0.001 | Decision confirmed |
| | Glycemic Control | 0.013 | 0.033 | Decision confirmed |

| Domains of HRQoL | Selected background variable | p-value | BH critical Value | Confirmation based on BH critical value |
|---|---|---|---|---|
| Role Limited Due to Emotional Health | Exercise | 0.001 | 0.001 | Decision confirmed |
| | Diabetic Complication | 0.001 | 0.001 | Decision confirmed |
| | Education | 0.003 | 0.027 | Decision confirmed |
| | Socio- Economic Status | 0.040 | 0.041 | Decision confirmed |
| Energy/ Fatigue | Socio- Economic Status | 0.050 | 0.044 | **Not confirmed** |
| Emotional Wellbeing | Co-morbidity | 0.001 | 0.001 | Decision confirmed |
| | Body Mass Index | 0.010 | 0.029 | Decision confirmed |
| | Exercise | 0.010 | 0.029 | Decision confirmed |
| Social Functioning | Socio- Economic Status | 0.004 | 0.028 | Decision confirmed |
| | Age | 0.020 | 0.034 | Decision confirmed |
| | Education | 0.030 | 0.036 | Decision confirmed |
| | Duration of Diabetes Mellitus | 0.030 | 0.036 | Decision confirmed |
| | Glycemic control | 0.040 | 0.041 | Decision confirmed |
| Pain | Age | 0.001 | 0.001 | Decision confirmed |
| | Socio- Economic Status | 0.010 | 0.029 | Decision confirmed |
| | Exercise | 0.030 | 0.036 | Decision confirmed |
| | Education | 0.050 | 0.044 | **Not confirmed** |
| General Health | Education | 0.001 | 0.001 | Decision confirmed |
| | Socio-Economic Status | 0.010 | 0.029 | Decision confirmed |

The overall HRQoL analysis revealed significant associations with age, education, occupation, socio-economic status, exercise, glycemic control, and diabetic complications and these findings were further validated using the Benjamini-Hochberg (BH) method, confirming the absence of false positives. These findings reinforce the importance of education, socio- economic status, exercise, glycemic control, and diabetic complications in shaping HRQoL among diabetics, emphasizing targeted interventions for improved patient outcomes.

### 4.12 Multiple regression

**Table 6: Multiple regression analysis described the contribution of each variable in predicting overall HRQoL**

| S.no | Name of the variable | Interpretation of the regression coefficients | Magnitude of contribution |
|---|---|---|---|
| 1 | Education | 1.008% of increase in HRQoL for every one higher level of increase in education | +ve |
| 2 | Occupation | - 0.754% of decrease in HRQoL for every one level of decrease in occupation | -ve |
| 3 | Age | -0.956% of decrease in HRQoL as age increases one level up | -ve |
| 4 | Socio-Economic status | 1.74% of increase in HRQoL for every one higher level of socio-economic status | +ve |
| 5 | Glycemic Control | -1.743% decrease in HRQoL for good glycemic control | -ve |
| 6 | Exercise | -2.450% decrease in HRQoL if no physical activity was done | -ve |

The predictor variables were significantly predict the HRQoL, $F(6,348) = 33.278$, $p<0.001$) and the regression model is a good fit of the six variables included in the analysis.

***HRQoL = 51.473+ (1.01) * Education – (0.737) * occupation – (0.950) *Age +(1.734) *Socio-Economic status-(1.685) *Glycemic control - (2.433) *Exercise***

### 4.13 Knowledge on Diabetes Mellitus among Diabetics

**Table 7: Distribution of Knowledge on Diabetes Mellitus among Diabetics (n=355)**

| Factors | Adequacy of knowledge | Frequency (%) |
|---|---|---|
| Causes of Diabetes | Adequate (≥2) | 201 (56.6) |
| | Inadequate (<2) | 154 (43.4) |
| Symptoms of Diabetes | Adequate (≥1) | 308 (86.8) |
| | Inadequate (<1) | 47 (13.2) |
| Management of Diabetes | Adequate (≥2) | 282 (79.4) |
| | Inadequate (<2) | 73 (20.6) |
| Complications of Diabetes | Adequate (≥3) | 193 (54.4) |
| | Inadequate (<3) | 162 (45.6) |
| Misconceptions about Diabetes | Adequate (≥1) | 155 (43.7) |
| | Inadequate (<1) | 200 (56.3) |
| Overall Knowledge on Diabetes | Adequate (≥9) | 204 (57.5) |
| | Inadequate (<9) | 151 (42.5) |

The overall knowledge was adequate to 204 (57.5%) Diabetics. The causes of Diabetes, Symptoms, management of Diabetes, Complications, and Misconception about Diabetes were 56.6%, 86.8%, 79.4%, 54.4% and 43.7% respectively. The knowledge on Symptoms of diabetes and management of diabetes were higher than the overall knowledge and also compared with other categories.

## CHAPTER-V

## DISCUSSION

### 5.1 HRQoL

The study estimates that the average HRQoL score among diabetics was 48.8(7.2). This is in line with Manjunath K et al but with a little higher score. Age, education, occupation, socio-economic status, exercise, Glycaemic control, comorbidity and diabetic complications were

found significant variables influencing HRQoL. Studies conducted in South India reported that diabetic patients with higher education levels and socioeconomic status exhibited better HRQoL, likely due to improved disease awareness and access to healthcare services and statistically significant association between education and physical health, treatment satisfaction, emotional health and diet satisfaction domain of HRQoL. [10,27] .

**Physical functioning:**

Poor physical functioning was observed in 40.6% of the participants, while only 27.6% exhibited good levels of functioning. A decline in physical capability was associated with increasing age. According to **Gupta J et al.** [29] Seventy five percent of individuals experienced a reduction in their ability to perform vigorous activities, though their endurance for daily tasks remained relatively unaffected. This decline may be linked to the natural aging process and neurological impairments caused by the underlying condition. These findings highlight the critical need for maintaining an active lifestyle across the lifespan. Engaging regularly in physical activity such as strength training, aerobic workouts, and flexibility exercises which can help reduce the impact of age-related physical decline.

**5.2 Role limited due to physical health:**

In the present study, the Role Limitation Due to Physical Health (RLPH) aspect of Health-Related Quality of Life (HRQoL) revealed that 30.5% of diabetic individuals experienced poor role functioning. Factors such as age, socioeconomic status, physical activity, and blood sugar control showed a significant association with RLPH. Similar results were reported by **Syed et al.** [27] found that older adults exhibited poorer physical health compared to middle-aged individuals, emphasizing age as a key determinant. **Gupta J et al.** [29] reported that in the RLPH domain the most affected was the work efficiency. People from lower socioeconomic backgrounds often have limited access to essential healthcare services, adequate nutrition, and routine medical care, which can negatively impact their health. Additionally, financial limitations may reduce their ability to engage in regular exercise, adhere to medical treatments, or maintain a healthy lifestyle further contributing to impaired physical functioning.

**5.3 Role Limited Due to Emotional Health (RLEH) and Emotional wellbeing**

The findings in this study highlight a significant emotional burden among diabetic patients, as evidenced by the high percentage (53.0%) experiencing poor Role Limited Due to Emotional Health (RLEH). This indicates that over half of the participants faced considerable challenges in fulfilling daily roles due to emotional distress, while only a small proportion (12.7%)

reported good RLEH. These limitations may emerge from the psychological impact of managing a chronic condition like diabetes, which often includes anxiety, depression, and stress over long-term health outcomes.

Educational attainment and occupational status were found to play a protective role, with individuals possessing higher education and those in professional jobs demonstrating better emotional resilience in this study. This suggests that education and financial stability may provide better access to coping resources, awareness of self-care strategies, and health services that support emotional well-being.

Socioeconomic status (SES) also significantly influenced emotional health, with the upper class reporting the highest rates of good RLEH. This correlation could be attributed to better living conditions, healthcare access, and reduced financial stress factors that collectively balance emotional strain.

In this study younger individuals had better emotional well-being, while those in the 51–55 age group it was worse. This may reflect the increased psychological burden that comes with aging and longer disease duration, compounded by concerns related to health decline and social responsibilities. Additionally, BMI, regular physical activity, and co-morbidities significantly influenced emotional health. Those who engaged in habitual exercise and maintained a healthier weight tended to report better emotional well-being, highlighting the importance of lifestyle modifications in diabetes management.

**Syed et al.** [27] reported contrasting findings where unemployed diabetics scored higher in the emotional health domain. It could be influenced by fewer job-related stressors or greater availability of time to focus on self-care.

The findings are supported by **Gautam Y et al.** [30] which showed a significant association between the SF-36 HRQoL domains including emotional health and factors such as socioeconomic status, education, and physical activity. These consistent results across studies shows the multiple nature of emotional health in diabetic populations and point toward the need for integrated care models that address both medical and psychosocial aspects of diabetes

### 5.4 Energy/ Fatigue

Energy/Fatigue levels among diabetics showed that 38.3% had poor Energy/Fatigue levels. Professionals had higher good Energy/Fatigue levels than the unemployed and the upper-class diabetics reported better energy levels compared to the lower class. Hence, Energy/Fatigue was

high among lower socio-economic status group compared to upper socio-economic status diabetics. **Sharma S et al.** [(1)] reported that the mean score of QOL of the patients was lowest in vitality domain. This could be due to associations between diabetes and chronic fatigue due to factors like blood sugar fluctuations, insulin resistance, and inflammation.

### 5.5 Bodily pain

In this study, the Pain domain of Health-Related Quality of Life (HRQoL) among individuals with diabetes were almost equally distributed as Poor, Fair and Good. A significant association was found between age and pain perception, suggesting that younger individuals experienced and reported pain more acutely than older adults. This is in align with a survey conducted by R.Quiton e tal, where age was also a factor, with older individuals more likely to report pain. This may be attributed to age- related sensory changes and the development of neuropathic complications that come with both aging and diabetes. Additionally, educational level and socioeconomic status were found to have a notable impact on how pain was perceived and managed. These findings are consistent with those of **Sharma S et al.** [(1)] who reported similar trends in educational level and socioeconomic status of diabetics.

### 5.6 Social functioning

An assessment of the Social Functioning (SF) domain within the Health-Related Quality of Life (HRQoL) among individuals with diabetes showed that 41.1% experienced poor social functioning, while only 23.9% demonstrated good functioning in this area. Social functioning was found to be significantly influenced by educational level and occupation. In according with this finding, another research indicates that educational level and occupation can influence diabetes management and social functioning. Higher paternal education and professional status were associated with better glycemic control in children with type 1 diabetes (Al-Agha et al., 2017). In contrary to the expected, individuals from higher socioeconomic backgrounds reported poorer social functioning, which may reflect how factors like social involvement and financial independence contribute to overall mental and social well-being. Additionally, those with a family history of diabetes and longer disease duration also showed lower SF scores. In contrast, **Sharma S et al.** [(1)] reported the highest scores in the SF domain, identifying vitality as the most affected area among both men and women, while social functioning was among the least impacted. This study also noted that individuals with higher levels of education tended to score better in domains such as general health, vitality, role emotional, and mental health, with the exception of the role physical domain where participants with only primary education performed better. These inconsistencies

between findings may be attributed to variations in demographics and cultural context.

### 5.7 General health

The assessment of the General Health (GH) domain within the Health-Related Quality of Life (HRQoL) among diabetic patients revealed that 43.1% had poor general health. Supporting this, **Gautam Y et al.** [30] reported that among the eight domains of the SF-36 questionnaire, General Health (GH) and Vitality (VT) were the most adversely affected among diabetics. A strong association was found between educational level and general health, with individuals possessing higher education perceiving their health more positively. Though, there was no direct impact of education on general health, higher awareness of complications and better diet adherence among more educated patients might be contributed among educated patients. Likewise, socioeconomic status emerged as a key factor, as participants from upper socioeconomic classes reported better GH scores than those from lower classes. This suggests that economic stability may enhance health literacy, access to medical care, and overall wellness.

### 5.8 Knowledge on Diabetes Mellitus

In the present study, 57.5% of diabetic patients had adequate overall knowledge of diabetes, with particularly high awareness about symptoms (86.8%) and management (79.4%). Similarly, a study conducted in a rural setting in Haryana, where a considerable proportion of patients demonstrated good awareness about the symptoms and management practices for diabetes **Singh et al.** [31]. Similarly, a study from Bengaluru found that while awareness of dietary control and medication adherence was relatively strong, knowledge about complications and long-term outcomes was lacking **Ramesh et al.** [32]. In this study, only 54.4% of participants were aware of diabetes complications, and misconceptions were prevalent among 56.3% of patients. These findings were similar with study conducted in the Saurashtra region of Gujarat, where significant misconceptions were observed, including beliefs in traditional remedies and fear of insulin therapy **Joshi et al.** [33]. These gaps in knowledge, particularly regarding complications and myths, highlight the need for tailored health education interventions that address not only basic disease understanding but also deeper misconceptions and consequences of poorly managed diabetes.

## CHAPTER- VI

### 6.1 Summary

The present study assessed the Health-Related Quality of Life (HRQoL) among Type 2 Diabetes Mellitus (T2DM) patients using a cross-sectional approach in a tertiary care hospital in Southern India. Data were analyzed across eight domains by using SF-36 questionnaire. Overall, the study found that sociodemographic factors like age, education, income, and employment status, longer duration of diabetes, presence of diabetic complications were significantly affecting the health-related quality of life in multiple domains. These findings highlight the importance of addressing multiple factors in diabetes management to improve patients' overall quality of life.

### 6.2 Conclusion

Type 2 Diabetes Mellitus significantly impairs patient health- related quality of life. Complications, chronicity, and adverse socioeconomic conditions exacerbate this impact. Therefore, managing T2DM should not be limited to glycemic control alone but must also encompass psychological counseling, social support, and lifestyle interventions aimed at improving overall well-being. Integrating HRQoL assessments into routine diabetic care can help develop patient-centered treatment strategies, ultimately improving long-term outcomes and quality of life.

**Reference:**


1. Sharma S, Mohan U, Singh SK, Deori TJ, Misra AK. Quality of life of type 2 diabetes mellitus patients attending a tertiary care hospital of Northern India: A cross sectional study. J Family Med Prim Care 2021;10:1938-44.
2. NHP. Overview of Diabetes Burden: NHP [online]. ; 2016 [Cited 2021 20th February] Available from URL: Overview of Diabetes Burden | National Health Portal of India (nhp.gov.in)
3. International Diabetes Federation. IDF Diabetes Atlas. 9th ed. Brussels: International Diabetes Federation, 2019.
4. World Health Organization. The World Health Day themes. Geneva: WHO [online]. 2021 [Cited 2021 20th February]. Available from URL: WHO | World Health Day.
5. International Diabetes Federation. IDF Diabetes Atlas, 10th ed. Brussels: International Diabetes Federation; 2021.
6. Anjana RM, Deepa M, Pradeepa R, et al. Prevalence of diabetes and prediabetes in 15 states of India: Results from the ICMR-INDIAB population-based cross-sectional

study. Lancet Diabetes Endocrinol. 2017;5(8):585–596.

7. Rubin RR, Peyrot M. Quality of life and diabetes. Diabetes Metab Res Rev. 1999;15(3):205–218.
8. Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes: A meta-analysis. Diabetes Care. 2001;24(6):1069–1078.
9. Chawla A, Chawla R, Jaggi S. Microvascular and macrovascular complications in diabetes mellitus: Distinct or continuum? Indian J Endocrinol Metab. 2016;20(4):546–551.
10. Nagpal J, Kumar A, Kakar S, Bhartia A. The development of 'Quality of Life Instrument for Indian Diabetes patients (QOLID): A validation and reliability study in middle and higher income groups. J Assoc Physicians India. 2010;58:295–304.
11. Stratton IM, Adler AI, Neil HA, et al. Association of glycaemia with macrovascular and microvascular complications of Type 2 diabetes (UKPDS 35): Prospective observational study. BMJ. 2000;321(7258):405–412.
12. Vinik AI, Casellini CM, Parson HK, Colberg SR, Nevoret ML. Diabetic neuropathy. Endocrinol Metab Clin North Am. 2013;42(4):747–787.
13. Afkarian M, Zelnick LR, Hall YN, et al. Clinical manifestations of kidney disease among US adults with diabetes, 1988–2014. JAMA. 2016;316(6):602–610.
14. Zhang X, Saaddine JB, Chou CF, et al. Prevalence of diabetic retinopathy in the United States, 2005–2008. JAMA. 2010;304(6):649–656.
15. Gross JL, de Azevedo MJ, Silveiro SP, et al. Diabetic nephropathy: Diagnosis, prevention, and treatment. Diabetes Care. 2005;28(1):164–176.
16. Emerging Risk Factors Collaboration. Diabetes mellitus, fasting glucose, and risk of cause-specific death. N Engl J Med. 2011;364(9):829–841.
17. Hossain P, Kawar B, Nahas ME. Obesity and diabetes in the developing world—A growing challenge. N Engl J Med. 2007;356(3):213–215.
18. Sjöström L, Narbro K, Sjöström CD, et al. Effects of bariatric surgery on mortality in Swedish obese subjects. N Engl J Med. 2007;357(8):741–752.
19. Ali S, Stone MA, Peters JL, Davies MJ, Khunti K. The prevalence of co-morbid depression in adults with Type 2 diabetes: A systematic review and meta-analysis. Diabet Med. 2006;23(11):1165–1173.
20. Ismail K, Winkley K, Rabe-Hesketh S. Systematic review and meta-analysis of randomized controlled trials of psychological interventions to improve glycemic

control in patients with Type 2 diabetes. Lancet. 2004;363(9421):1589–1597.

21. Fisher L, Chesla CA, Skaff MM, et al. The family and disease management in Hispanic and European-American patients with Type 2 diabetes. Diabetes Care. 2000;23(3):267–272.
22. Norris SL, Engelgau MM, Narayan KM. Effectiveness of self-management training in Type 2 diabetes: A systematic review of randomized controlled trials. Diabetes Care. 2001;24(3):561–587.
23. Look AHEAD Research Group. Cardiovascular effects of intensive lifestyle intervention in Type 2 diabetes. N Engl J Med. 2013;369(2):145–154.
24. Zinman B, Wanner C, Lachin JM, et al. Empagliflozin, cardiovascular outcomes, and mortality in Type 2 diabetes. N Engl J Med. 2015;373(22):2117–2128.
25. Gonzalez JS, Peyrot M, McCarl LA, et al. Depression and diabetes treatment nonadherence: A meta-analysis. Diabetes Care. 2008;31(12):2398–2403.
26. Trikkalinou A, Papazafiropoulou AK, Melidonis A. Type 2 diabetes and quality of life. World J Diabetes. 2017;8(4):120–129.
27. Syed W, Menaka M, Parimalakrishnan S, Yamasani VV. Evaluation of the association between social determinants and health-related quality of life among diabetic patients attending an outpatient clinic in the Warangal region, Telangana, India. J Diabetol 2022;13:285-93.
28. John R, Pise S, Chaudhari L, Deshpande PR. Evaluation of quality of life in type 2 diabetes mellitus patients using quality of life instrument for indian diabetic patients: A cross-sectional study. Journal of mid-life health. 2019 Apr 1;10(2):81-8.
29. Gupta J, Kapoor D, Sood V. Quality of life and its determinants in patients with diabetes mellitus from two health institutions of sub-himalayan region of India. Indian J Endocr Metab 2021;25:211-9.
30. Gautam Y, Sharma AK, Agarwal AK, Bhatnagar MK, Trehan RR. A cross-sectional study of QOL of diabetic patients at tertiary care hospitals in Delhi. Indian journal of community medicine. 2009 Oct 1;34(4):346-50.
31. Singh AK, Gupta R, Sharma A. Assessment of knowledge and awareness regarding diabetes among diagnosed patients in a rural tertiary care setting in Haryana. J Family Med Prim Care. 2023;12(5):1234-9.
32. Ramesh N, Vijayalakshmi N, Muthulakshmi M. Knowledge, attitude and practice on management of diabetes among type 2 diabetic patients in a tertiary care hospital, Bengaluru. Int J Community Med Public Health. 2017;4(1):152-6.

33. Joshi J, Patel P, Gandhi S, Patel N, Chaudhari A. Factors influencing adherence to self-care practices among patients of type 2 diabetes mellitus from Saurashtra region of Gujarat: A conclusive research. J Family Med Prim Care. 2022;11(10):6395-401.

SRI BALAJI VIDYAPEETH
Examinations

OFFICE OF THE CONTROLLER OF EXAMINATIONS
Dr. **S. SRIRANGARAJ**
Controller of Examinations

Date: 14-03-2022

No. SBV/COE/Ph.D/Feb-22/A5

## UNIVERSITY MEMORANDUM

***Sub*** : Sri Balaji Vidyapeeth – Ph.D Degree in Part – I Methodology Written Examination - February 2022 – Results Notified.

* * * * *

Mr/Mrs/Dr. **JANANI S,** UIN. **1905002016** Research Scholar in Statistics (Part Time - External) is declared to have passed the Ph.D Part-I – Methodology Examination held in February 2022 and he/she is permitted to continue the research under the guidance of Dr. **G. EZHUMALAI** and submit the thesis for the award of Ph.D Degree as per the regulations of SBV.

| Sl. No. | Subjects | Result Status |
|---|---|---|
| 1 | PAPER - I RESEARCH METHODOLOGY AND PROTOCOL | **PASS** |
| 2 | PAPER - II ON CHOSEN FIELD OF RESEARCH | **PASS** |

S. Sriranganaraj

CONTROLLER OF EXAMINATIONS

To : Mr/Mrs/Dr. **JANANI S** through the Guide, SBV

*Through :* Dr. G. EZHUMALAI, Senior Statistician, SBV.

CC : The Guide.

4 Credit Points

# CERTIFICATE

This is to certify that

Dr./Mr./Ms. **Janani S** (Ph.D. Scholar)

UIN No. 1905002016 has attended, actively participated and fulfilled the requirements as per University norms of the online workshop on "**RESEARCH METHODOLOGY, BIO-STATISTICS AND PREPARATION OF SCIENTIFIC MANUSCRIPT**" held at Sri Balaji Vidyapeeth, Puducherry from 10.03.2021 to 15.04.2021

| | | |
|---|---|---|
| **Dr. C. Adithan** | **Dr. A. R. Srinivasan** | **Dr. Subhash Chandra Parija** |
| Dean Research, SBV | Registrar, SBV | Vice-Chancellor, SBV |

SRI BALAJI VIDYAPEETH

ACCREDITED BY NAAC WITH 'A' GRADE

DEEMED TO BE UNIVERSITY
DECLARED U/S 3 OF THE UGC ACT, 1956

# Certificate

*This is to certify that Dr./Mr./Ms* **Ms. Janani S**

*UIN No.* **1905002016** *has attended, actively participated in " UGC Mandate RESEARCH AND PUBLICATION ETHICS COURSE " held at Sri Balaji Vidyapeeth, Puducherry from 16.06.2021 to 21.07.2021.*

*He /she has fulfilled the requirements as per University norms of the online course and secured* **A** *Grade and 2 credit points.*

| Dr. N.Vezhavendhan | Dr. C.Adithan | Dr. A.R.Srinivasan | Dr. Subash Chandra Parija |
|---|---|---|---|
| Program coordinator | Dean Research, SBV | Registrar, SBV | Vice-Chancellor, SBV |

# SRI VENKATESHWARAA MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE

(Affiliated to Pondicherry University, Pondicherry.)
No.13-A, Pondy - Villupuram Main Road, Ariyur, Puducherry - 605 102. Tel: 0413 - 2260601,
E-mail: svmch_pondy@yahoo.com Website : svmchrc.ac.in


No: 141/ SVMCH/IEC- Cert/Nov21

Dated: 07.12.21

**Institutional Ethics Committee (Human Studies)**

| | |
|---|---|
| **Name of the Principal Investigator** | Ms. S. Janani<br>Tutor cum Statistician<br>Part time External PhD Scholar<br>Sri Balaji Vidyapeeth University<br>Department of Community Medicine<br>Sri Venkateshwaraa Medical College Hospital & Research Centre,<br>Ariyur, Puducherry – 605 102 |
| **Title of the Study** | "IMPACT OF TYPE 2 DIABETES MELLITUS ON HEALTH RELATED QUALITY OF LIFE AMONG PATIENTS FROM A TERTIARY CARE HOSPITAL IN SOUTHERN INDIA". |
| **Name of the Guide** | Dr. G. Ezhumalai<br>Senior Statistician & Research Consultant<br>Office of Dean Research<br>Sri Balaji Vidyapeeth University, Puducherry |
| **Name of the Co-guide** | Dr. S. Mahadevan<br>Dean (Research & PG studies)<br>Sri Venkateshwaraa Medical College Hospital & Research Centre, Ariyur, Puducherry – 605 102 |

Certified that the above mentioned research proposal had been presented, revised and approved in the Institutional Ethics Committee with the following terms and conditions.

1. The candidate is permitted to carry out the work under the supervision of the designated guides.
2. Any serious adverse event occurring during the course of the study should be reported to the IEC within a period of seven days.
3. A six month progress report of the study has to be submitted to the IEC for review.
4. On completion of the study a final report has to be submitted to the IEC.
5. Any change in the study procedure/site/investigator should be informed to the IEC.

**CHAIRPERSON**
**Dr. Jharna Mandal, MD**
Professor and Head
Department of Microbiology
Jawaharlal Institute of Postgraduate Medical
Education and Research
Puducherry – 605006

SRI VENKATESHWARAA MEDICAL COLLEGE & HOSPITAL ★ PUDUCHERRY ★ CHAIRMAN INSTITUTIONAL ETHICS COMMITTEE

**MEMBERSECRETARY**
**Dr. Sushmita Sana Chowdhury, MD**
Assistant Professor
Department of Microbiology
Sri Venkateshwaraa Medical College
Hospital &Research Centre
Puducherry – 605102

SRI VENKATESHWARAA MEDICAL COLLEGE & HOSPITAL ★ PUDUCHERRY ★ MEMBER SECRETARY INSTITUTIONAL ETHICS COMMITTEE

# srivenkateshwaraa
## Medical College Hospital & Research Centre

CREATING HEALTHIER SOCIETY

Ariyur, Puduchery-605102

**DEPARTMENT OF COMMUNITY MEDICINE & MEDICAL EDUCATION UNIT**

## Certificate of Participation
## Is hereby awarded to

## Ms. Janani S

has participated in the **Oral Presentation** titled **" Prevalence of Nutritional deficiency among Type 2 Diabetes Mellitus patients attending a tertiary care hospital in Puducherry"** in the National Workshop conducted in view of **"World Diabetes Day"** held on 15th November 2021 organized by the Department of Community Medicine and Medical Education Unit, SVMCH& RC. Puducherry.

| | | | |
|---|---|---|---|
| Dr.D.R. Vedapriya,M.D., Prof. & Head, Dept of Community Medicine, SVMCH&RC | Dr.K.Tamilselvan,M.D., Prof. & Head, Physiology, MEU Coordinator, SVMCH&RC | Dr.S.Mahadevan,MD,DCH, MNAMS,PhD., Dean (Research & PG Studies), Professor(SS), Pediatrics, SVMCH&RC | Dr.S. Ratnasamy,B.Sc., M.S., Dean, Head - MEU, SVMCH&RC |

srivenkateshwaraa
Medical College Hospital & Research Centre

CREATING HEALTHIER SOCIETY

Ariyur, Puducherry-605102

# DEPARTMENT OF COMMUNITY MEDICINE & MEDICAL EDUCATION UNIT

## *Certificate of Appreciation*

This is to certify that Ms. JANANI

has participated and won SPECIAL prize in the

**" World Food Day Poster competition 2021"**

titled INFLUENCE OF DIETARY PATTERN AMONG TYPE II DIABETES PATIENTS WITH PERIPHERAL NEUROPATHY IN URBAN PUDUCHERRY

held on 18th October 2021 organized by the Department of Community Medicine, SVMCH & RC, Puducherry .

| | | | |
|---|---|---|---|
| Dr.S.Vijayalakshmi,M.D., Org. Secretary, Asso. Prof Dept of Community Medicine SVMCH&RC | Dr.K.Tamilselvan,M.D., Prof. & Head, Physiology, MEU Coordinator, SVMCH&RC | Dr.D.R. Vedapriya,M.D., Prof. & HOD Dept of Community Medicine SVMCH&RC | Dr.S. Ratnasamy, B.Sc., M.S., Dean, HOD - MEU SVMCH&RC |

https://africanjournalofbiomedicalresearch.com/index.php/AJBR
*Afr. J. Biomed. Res. Vol. 27(4s) (November 2024); 1857 - 1862*
*Research Article*

# "Impact of Type 2 Diabetes Mellitus on Health-Related Quality of Life among patients from a Tertiary Care Hospital in Southern India"

**Janani S[1], Ezhumalai G[2]*, Mahadevan S[3]**

[1] Tutor cum Statistician, Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry & Ph. D. Research Scholar, Sri Balaji Vidyapeeth (Deemed- to be- University), Puducherry
[2] *Professor of Biostatistics, Sri Balaji Vidyapeeth (Deemed-to be- University), Puducherry
[3] Professor of Paediatrics, Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry

***Corresponding Author:** Ezhumalai G
Professor of Biostatistics, Sri Balaji Vidyapeeth (Deemed-to be- University), Puducherry,
Email: ezhumalaig@mgmcri.ac.in, ORCID: 0000-0003-2373-9994

**Abstract**
**Background:** Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder that significantly impacts the health-related quality of life (HRQoL) of affected individuals. Managing diabetes involves not only glycemic control but also addressing the physical, emotional, and social well-being of patients. HRQoL is increasingly recognized as a crucial outcome in diabetes care, reflecting the overall burden of the disease on patients' lives. This study evaluates the association of demographic, socioeconomic, and clinical factors with HRQoL among patients with T2DM at a tertiary care hospital, providing insights into potential areas for intervention. **Materials and methods:** Cross-sectional study included adults with Type 2 diabetes mellitus (T2DM) who are visiting the outpatient clinics of Department of General Medicine, Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry for follow-up. Patients of either sex between the age of 40 years and below 60 years, , and willing to provide informed consent were included in this study. **Result:** Total of 355 T2DM were considered for the study to evaluate the knowledge on diabetes. Maximum of the study participants were belonging to age between the 46 and 50 years of age with 101 (28.5%) followed with 92 (25.9%) were between 41 to 45 years. The overall HRQoL score was 48.81±7.22. **Conclusion:** This study highlights that multiple factors, including age, education, occupation, physical activity, glycaemic control, and the presence of diabetic complications, significantly impact health-related quality of life (HRQoL) in patients with type 2 diabetes mellitus.

**Keywords:** Type 2 Diabetes Mellitus, Health related Quality of Life, Southern India, General Health

***Author for correspondence*: *Email***: *ezhumalaig@mgmcri.ac.in*

*Received: 27/10/2024* *Accepted: 10/11/2024*

*DOI: https://doi.org/10.53555/AJBR.v27i4S.3952*

*© 2024 The Author(s).*
*This article has been published under the terms of Creative Commons Attribution-Noncommercial 4.0 International License (CC BY-NC 4.0), which permits noncommercial unrestricted use, distribution, and reproduction in any medium, provided that the following statement is provided. "This article has been published in the African Journal of Biomedical Research"*

## Introduction

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance and impaired insulin secretion, leading to hyperglycaemia. Globally, the prevalence of T2DM has risen significantly, with the International Diabetes Federation (IDF) reporting approximately 537 million adults affected by 2021, and projections suggesting this number could reach 643

https://africanjournalofbiomedicalresearch.com/index.php/AJBR
*Afr. J. Biomed. Res. Vol. 27(4s) (November 2024); 1840-1844*
*Research Article*

# "A Cross sectional Study on Assessment of Knowledge About Type 2 Diabetes Mellitus Among Diabetes Mellitus Patients Attending a Tertiary Care Hospital in Southern India"

**Janani S[1], Ezhumalai G[2]*, Mahadevan S[3]**

[1] Tutor cum Statistician, Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry & Ph. D Research Scholar, Sri Balaji Vidyapeeth (Deemed-to be- University), Puducherry
[2] *Professor of Biostatistics, Sri Balaji Vidyapeeth (Deemed-to be- University), Puducherry
[3] Professor of Paediatrics, Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry

***Corresponding Author:** Ezhumalai G
Professor of Biostatistics, Sri Balaji Vidyapeeth (Deemed-to be- University), Puducherry
Email: ezhumalaig@mgmcri.ac.in, ORCID: 0000-0003-2373-9994

**Abstract**
**Background:** Type 2 Diabetes Mellitus (T2DM) is a significant public health concern, particularly in India, where the prevalence is rapidly increasing. Effective management and patient education are crucial for improving health outcomes and quality of life for T2DM patients.
**Objective:** This study aims to evaluate the knowledge of T2DM patients attending a hospital in Southern India, using the Diabetes Knowledge Questionnaire (DKQ-24)
**Methods:** A cross-sectional study was conducted at the Department of General Medicine, Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry. A total of 355 T2DM patients aged 41-60 years participated. Data were collected through patient self-reports and medical records, including demographic information, duration of diabetes, HbA1c levels, and responses to the DKQ-24.
**Results:** The majority of participants 191 (53.8%) were male, with 101 (28.5%) aged between 46-50 years. About 201 (50%) had higher secondary education or above. Most participants belonged to the middle 100 (28.2%) and lower middle class 80 (22.5%). The prevalence of neuropathy 264 (74.4%) and hypertension 270 (76.1%) were significant among participants. Adequate knowledge of diabetes was found in 226 (63.7%) of participants, with 308 (86.8%) understanding diabetes symptoms and 282 (79.4%) being knowledgeable about diabetes management.
**Conclusions:** The findings underscore the importance of targeted educational interventions to improve diabetes knowledge and management among T2DM patients in Southern India. Addressing socio-economic disparities and enhancing patient education can lead to better health outcomes and improved quality of life for T2DM patients.

**Keywords:** Type 2 Diabetes Mellitus, Diabetes Knowledge Questionnaire, Patient Education, Southern India

***Author for correspondence*: *Email**: *ezhumalaig@mgmcri.ac.in*

*Received: 27/10/2024* *Accepted: 10/11/2024*

*DOI: https://doi.org/10.53555/AJBR.v27i4S.3949*

*© 2024 The Author(s).*
*This article has been published under the terms of Creative Commons Attribution-Noncommercial 4.0 International License (CC BY-NC 4.0), which permits noncommercial unrestricted use, distribution, and reproduction in any medium, provided that the following statement is provided. "This article has been published in the African Journal of Biomedical Research"*